PATENT SPECIFICATION 882,258

DRAWINGS ATTACHED.

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COMPLETE SPECIFICATION.

Improvements in or relating to Motor Lorries or Trailers with Extensible Side Pieces.

I, HERBERT VIDAL, trading as HERBERT VIDAL & CO., of Milchgrund 41, Hamburg-Harburg, Germany, of German nationality, do hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement :—

This invention relates to road vehicle superstructures; it relates particularly to road vehicle superstructures having laterally extensible portions.

Wheeled vehicles are known in which the superstructure comprises (1) a rigid body, which may be fixed to a chassis, and (2) lateral portions (which are hereinafter referred to as "side-pieces") which are slidable inwardly and outwardly with respect to the body, so as to reduce the external width of the vehicle whilst it is travelling and make additional space available inside when it is stationary.

The present invention provides an improved construction of such superstructure. The side-pieces of known constructions are only drivingly connected with the body at their bottom (near the floor), whereas at their top (near the roof) they are either completely unsupported or are only attached by a mechanism which does not drivingly assist in the inward and outward movement. Friction can thus occur between the upper parts of such side-pieces and the body of the vehicle during their extension or retraction, because of the torsional forces acting on the side-pieces. This friction is aggravated when the vehicle is very long or is used on uneven ground, and materially increases the power-consumption required for lateral movement, causes damage to the coachwork and even makes lateral movement impossible under some conditions.

The present invention avoids this disadvantage. It is suitable for road vehicles, including trailers, whether used on roads or on uneven ground.

A road vehicle superstructure according to the invention comprises a body and a laterally extensible side-piece, and a mechanism drivingly connected with and supporting the top and bottom of the side-piece for effecting guided movement of the side-piece laterally with respect to the body. Such superstructures normally comprise two extensible side-pieces, and according to a preferred feature of the invention, the side-pieces include front and rear end walls, and the mechanism includes upper and lower elements connected to the top and bottom respectively of the front and rear ends of each side-piece for supporting and effecting movement of the side-piece.

The elements connected to the front and rear end walls of the side-pieces, as just described, may be constructed in a number of ways. They may comprise threaded spindles on which internally threaded members are mounted or toothed racks engaged with pinions; or cables; in each case, movement of one or other member is arranged to cause lateral movement of the side-piece with respect to the body.

In the case of screw-spindles or rack-and-pinion elements, these possess the particular advantage that the horizontally acting tensile and compressive forces produced by weight of each side-piece and any load contained therein are taken up by the upper and lower elements respectively.

The upper and lower driving and supporting elements may most conveniently be arranged in the same vertical plane as each other, and are preferably connected together so that the same driving force can be transmitted simultaneously to the upper and lower elements, and also preferably to the elements at both ends of the vehicle. Each side-piece is usually supported at four points, and a single manual or mechanical drive should thus be transmitted, by for example an endless chain or cable or by a shaft, to eight points on a superstructure having two side-pieces.

In a preferred embodiment in which the driving and supporting elements comprise internally threaded elements mountable on respective spindles, the upper spindles are attached to the top of the side-pieces, and co-operate with internally threaded members such as wheels or nuts, which are rotatably attached to the roof of the body, whilst the lower spindles are located below the floor of the body and co-operate with internally threaded members attached to, or formed as extensions of, the bottom of the side-pieces. In this way the largest possible head-room is provided when the side-pieces are in the extended position since no spindle or other member is then present in the neighbourhood of the roof of the body.

The lower spindles may advantageously be combined into one spindle, so that the lower elements at one end of the body of the vehicle comprise a single spindle having oppositely directed threads on each of its halves and rotatably attached to the body of the vehicle for engagement of each respective half with an internally threaded member rigidly attached to the bottom of the end wall of the side-piece. This arrangement has the advantage that the compressive forces, due to the weight of the side-pieces (and of any load therein), which are taken up by the lower spindle are substantially equal and opposite from each side and thus cancel each other out; no special thrust bearings are thus necessary to mount the spindle on the body.

The upper spindles are not combined but are attached to and move out with the side-pieces so as to provide maximum head-room, as described above; however the tensile forces taken up by these spindles are then not equalised and thrust bearings must be fitted to the rotatable wheels or nuts.

The upper wheels or nuts may also serve as part of the mechanism for transferring the drive from the lower to the upper elements, and from one end of the body to the other.

In order to attain a still greater standing or transit-height, at least a portion of the roof can also be extended vertically according to the invention, in addition to the extensibilty of the two side parts. The screw spindles are arranged as described previously, namely, a single lower-spindle and separate upper spindles. The transfer of the rotary movement from the lower to the upper screw spindles is effected by means of vertical, threaded shafts and corresponding pairs of bevel gears. The vertically movable roof is moved up and down, according to the direction of rotation of these shafts, on four supports which are provided at their lower ends with threaded portions which travel on the vertical shafts.

Two embodiments of the invention are described below with reference to the accompanying drawings, in which:

Fig. 1 is a view of an embodiment with extensible side-pieces, in the closed position.

Fig. 2 is a similar view of the embodiment shown in Fig. 1, but in the open position.

Fig. 3 is a view of another embodiment with extensible side-pieces and also to an extensible roof, in the closed position.

Fig. 4 is a view of the embodiment of Fig. 3, but in the open position.

All the figures show a view from the rear left-hand side, in which the rear wall of the body is omitted and the body is seen partly in cross-section. Except that the crank-handle and its gears (24, 25, 26 or 67, 68, 69) are arranged only at the rear end of the body, the mechanism is identical at the front and at the rear ends of the superstructure; hence only the mechanism at the rear is shown in the drawings.

In Figs. 1 and 2, a base 1 carries longitudinal bearers 2 and 3 which support the floor 3A. The front wall of the body is shown at 4 and the roof of the body at 5; there are no side-walls to the body. The left-hand and right-hand extensible side-pieces are shown, in the closed position in Fig. 1 and the open position in Fig. 2, as 6 and 7. As driving and supporting elements for the side-pieces, the threaded spindles 21 and 22 are fixed to the top of the end wall of each side-piece and the threaded collars 27 and 28 project downwards from the innermost point of the bottom of each end wall. The spindles 21 and 22 pass through unthreaded bearing pieces 11 and 12 dependent from the outermost part of the roof, whilst the collars 27 and 28 travel along a lower spindle 8 which is threaded in opposite directions in its left-hand and right-hand halves, and which is pivoted in bearings 9 and 10 mounted on the bearings 2 and 3.

Pulley wheels 13 and 14 are keyed to the spindle 9; above them similar wheels 17 and 18 are threaded on threaded spindles 21 and 22 between pairs of nuts 19 and 20 (only one of each pair can be seen in the drawings) which serve as hubs between the wheels and the bearing pieces 11 and 12. Endless cables

15 and 16 pass over the upper and lower pulley wheels and thence to corresponding wheels (not shown) at the front.

The operation of this embodiment is as follows. When it is desired to extend or retract the side-pieces, drive is provided manually with a crank handle 24 and is transmitted via a worm 25 and worm gear 26 to the spindle 8 and hence via the collars 27 and 28 directly to the lower portion of each side-piece, and also via the cables to the wheels 17 and 18 and thus to the upper portion of each side-piece. The side-pieces are thus drivingly connected and supported at both their top and their bottom. The drive is transmitted to the mechanism at the front end of the vehicle via the cables 15 and 16.

The maximum height available inside the body is identical in both the open and closed positions, and is represented by the measurement 23; this can be compared with measurements 66 and 66A in Figs. 3 and 4.

The side-pieces are provided with a floor at a level just above or below the level of the floor 3A of the body. A flexible waterproof covering such as sailcloth may be connected between the top of each side wall and the roof of the body.

Figs. 3 and 4 show an embodiment which incorporates an extensible roof and mechanism for its raising and lowering. The numerals 30—32A, 36—37, 47—49 and 62—69 represent parts which correspond to the parts numbered 1—3A, 6—10 and 21—28 in Figs. 1 and 2. Thus, the substructure 30 carries bearers 31 and 32 on which are mounted bearings 48 and 49 for the spindle 47 which has a left-hand thread in one half and a right-hand thread in the other half. At the top of the side-pieces 36 and 37 are fixed spindles 62 and 63 on which are located pairs of nuts 60 and 61, and at their bottom are threaded collars 64 and 65 which travel on the spindle 47.

The lateral parts of the roof are rigidly fixed to the chassis by vertical supports such as is shown, at the front end, at 35. The central part 38 of the roof is vertically slidable to a distance equal to the length of the supports 39, 40 (and 41 and 42 at the front end), the lower ends of which are turned inward and terminate in threaded portions 43 which travel on the threaded upper parts of shafts 54, 55. Bracing pieces (44) and cross-pieces (45, 46) are preferably provided at each end of the movable roof, so as to form together with the supports 39—42 a framework which is covered with a weatherproof material (not shown), whilst a flexible weatherproof material (not shown) covers the gap between the fixed and movable parts of the roof whilst in the extended position. Pairs of bevel gears 50—53 and 56—59 are mounted on the spindles and shafts. These gears are all keyed to their axes, except for the gears 58 and 59 which are threaded on the spindles 62 and 63 between the nuts 60 and 61 which serve as hubs; these gears 58 and 59 are thus mounted similarly to the wheels 17 and 18 in the first embodiment. A single cable 70 passes round a pulley wheel 71 attached to the worm gear 69, and thence passes round a corresponding wheel (not shown) at the front.

The operation of this embodiment is as follows. The drive is transmitted from crank handle 67 to the lower portion of each side-piece as in the first embodiment, by the travel of the nuts 64 and 65 on the spindle 47; it is also transmitted via the lower pairs of bevel gears to the shafts 54 and 55, thence to the upper bevel gears which cause the spindles 62 and 63 to move in or out, and hence the upper portion of each side-piece is positive guided and transported as well as the lower portion. The rotation of the shafts 54 and 55 also causes the threaded portions 43 of the roof supports to travel up or down, and thus the roof is also raised or lowered. The drive is transmitted to the mechanism at the front end of the vehicle via the chain or cable 70.

The maximum height inside the body increases from 66 in Fig. 3 when the roof is lowered to 66A in Fig. 4, when the roof is raised.

Instead of the pulley wheels 13, 14 and 71 and the cables 15, 16 and 70, sprocket wheels and chains may be used. Instead of the crank handle 24 or 67, drive may be provided mechanically.

WHAT I CLAIM IS:—

1. A road vehicle superstructure which comprises a body and a laterally extensible side-piece, and a mechanism which both supports and positively drives the top and the bottom of the side-piece for effecting guided movement of the side-piece laterally with respect to the body.

2. A vehicle superstructure as claimed in Claim 1, which comprises two extensible side-pieces.

3. A vehicle superstructure as claimed in Claim 2, in which the side-pieces include front and rear end walls, and the mechanism includes upper and lower elements connected to the top and bottom respectively of the front and rear ends of each side-piece for supporting and effecting movement of the side-piece.

4. A vehicle superstructure as claimed in Claim 3, in which the elements comprise internally threaded members for threaded engagement with respective spindles, each member and spindle being arranged so that rotation of the member or the spindle causes relative movement of the respective side-piece axially with respect to the spindle.

5. A vehicle superstructure as claimed

in Claim 4, in which the internally threaded member is a wheel or nut.

6. A vehicle superstructure as claimed in Claim 3, in which the elements comprise pinions for engagement with respective toothed racks, each pinion and rack being arranged so that rotation of the pinion or movement of the rack causes relative movement of the respective side-piece axially of the spindle.

7. A vehicle superstructure as claimed in any of Claims 3 to 6, in which the horizontally-acting tensile and compressive forces produced by the weight of each side-piece and any load contained therein are taken up by the upper and lower elements respectively.

8. A vehicle superstructure as claimed in Claim 3, in which the elements comprise cable drive.

9. A vehicle superstructure as claimed in any of Claims 3 to 5, in which an upper element comprises a spindle which is rigidly attached to the top of the front or rear end wall of the side-piece for engagement with an internally threaded member which is rotatably attached to the body of the vehicle.

10. A vehicle superstructure as claimed in any of Claims 3 to 5 in which a lower element comprises a spindle which is rotatably attached to the body of the vehicle for engagement with an internally threaded member rigidly attached to the bottom of the end wall of the side-piece.

11. A vehicle superstructure as claimed in any of Claims 3 to 5, in which the lower elements at one end of the body comprise a single spindle having oppositely-directed threads on each of its halves and rotatably attached to the body of the vehicle for engagement of each respective half with an internally threaded member rigidly attached to the bottom of the end wall of the side-piece.

12. A vehicle superstructure as claimed in any preceding claim, in which at least a portion of the roof is vertically extensible.

13. A vehicle superstructure as claimed in Claim 12, in which the movement of the mechanism effecting movement of the side-piece is transmitted to effect movement of the extensible portion of the roof vertically with respect to the body.

14. A vehicle superstructure as claimed in Claim 13, in which the mechanism effecting movement of the side-piece is as claimed in any of Claims 9 to 11, and vertical threaded shafts are arranged for engagement with internally threaded members attached to the extensible portion of the roof, and are connected by gears to the upper and lower elements, such that vertical movement of the roof occurs on movements of the elements.

15. A vehicle superstructure, substantially as hereinbefore described with reference to Figs. 1 and 2 of the accompanying drawings.

16. A vehicle superstructure, substantially as hereinbefore described with reference to Figs. 3 and 4 of the accompanying drawings.

POLLAK, MERCER & TENCH,
Chartered Patent Agents,
Audrey House, Ely Place,
London, E.C.1,
Agents for the Applicant.

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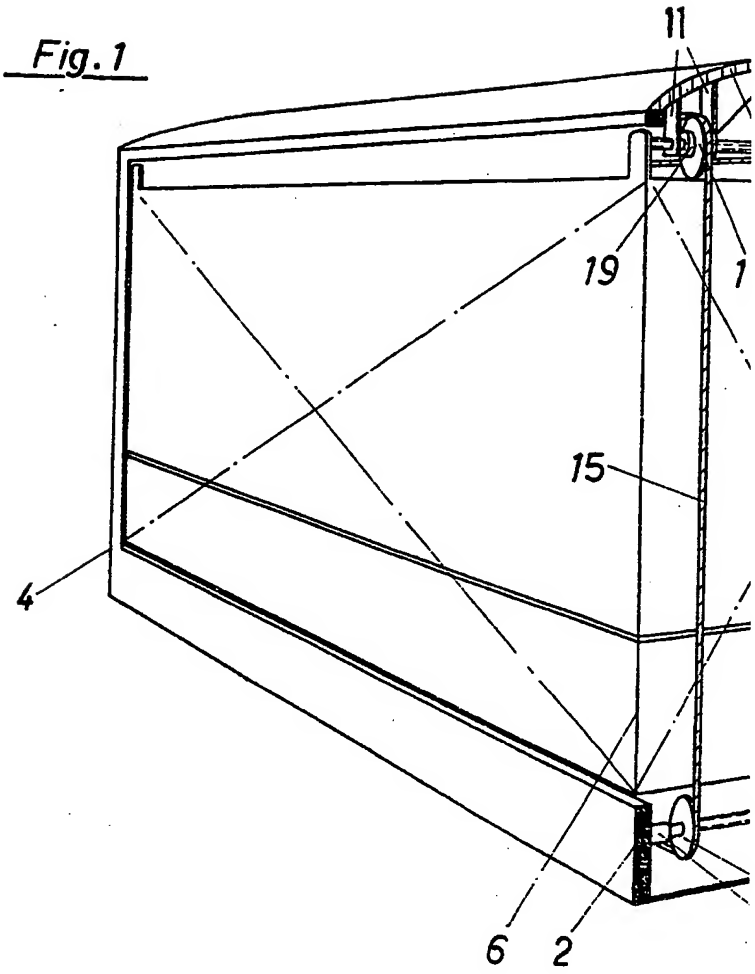
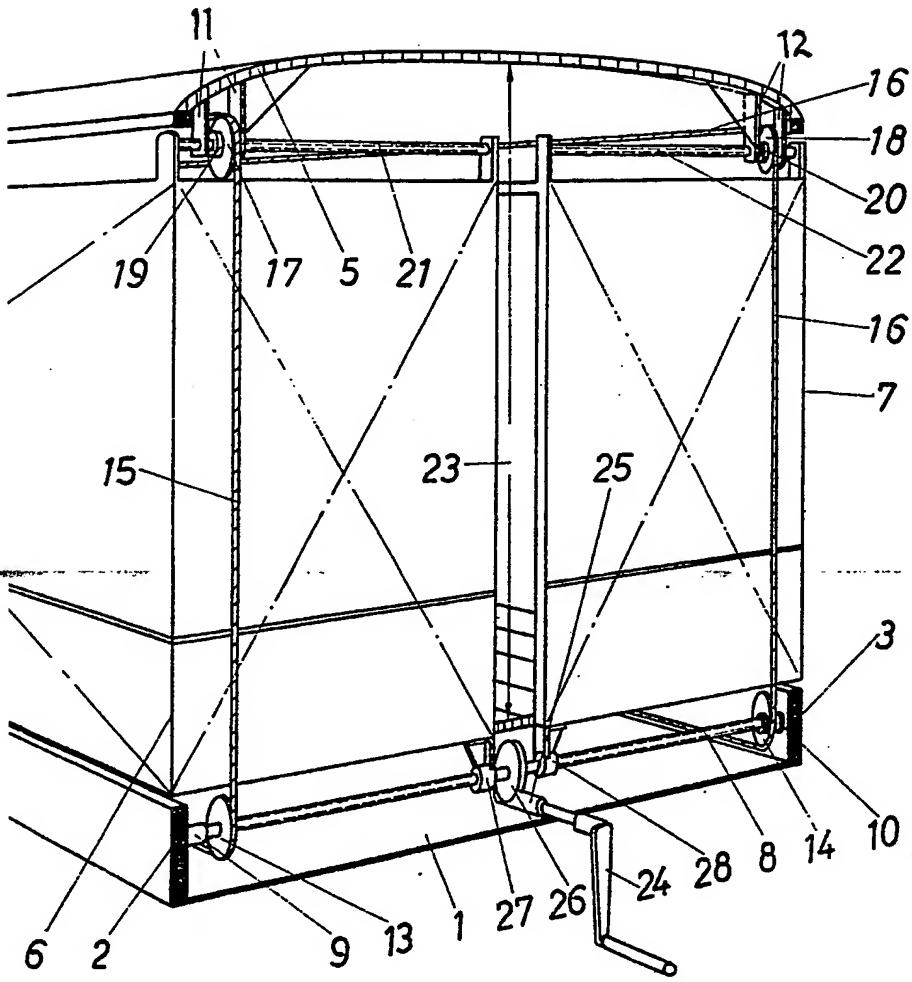
Fig. 1



882,258 COMPLETE SPECIFICATION

3 SHEETS *This drawing is a reproduction of the Original on a reduced scale.*

SHEET 1



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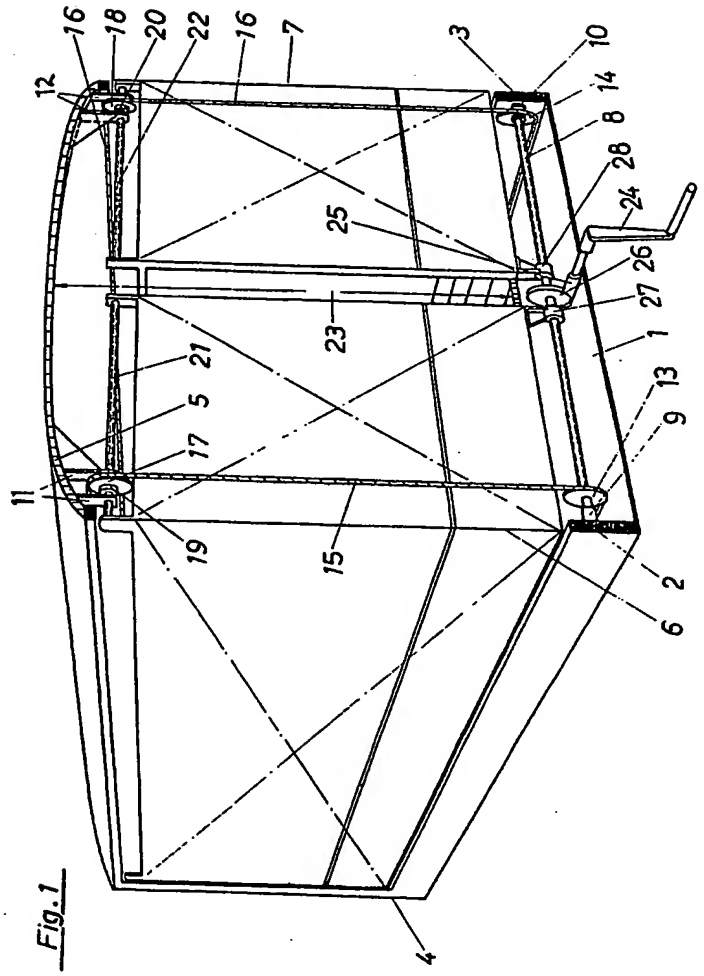
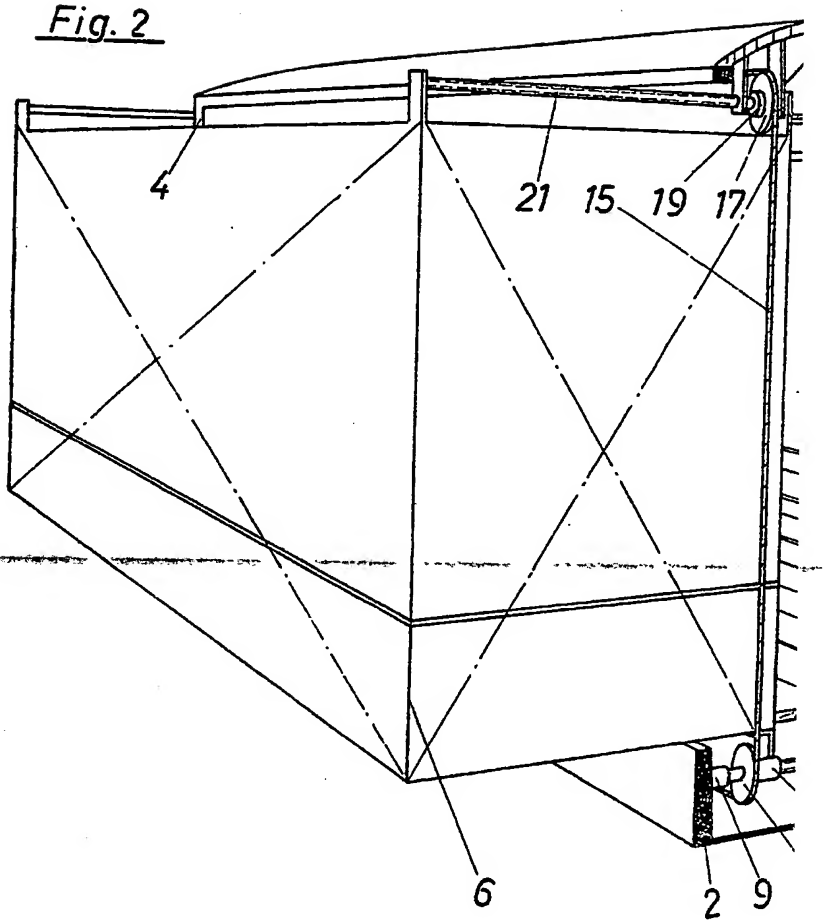


Fig. 1

Fig. 2



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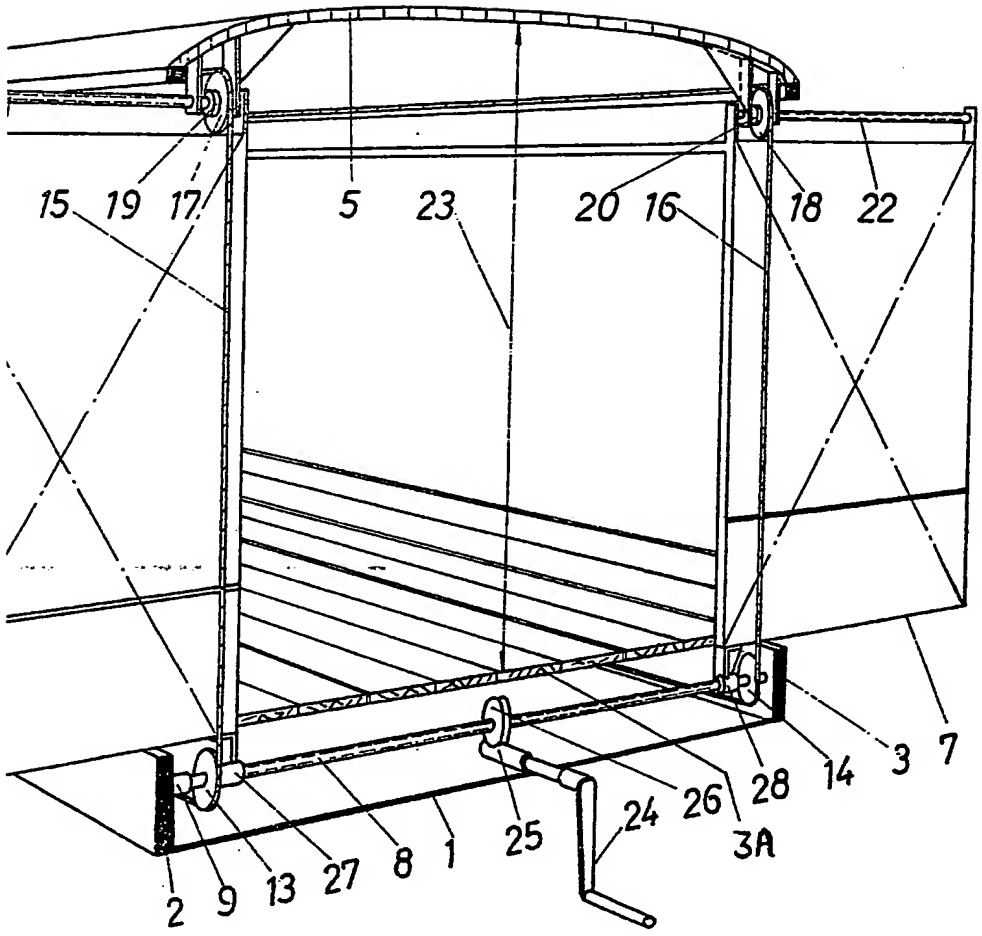

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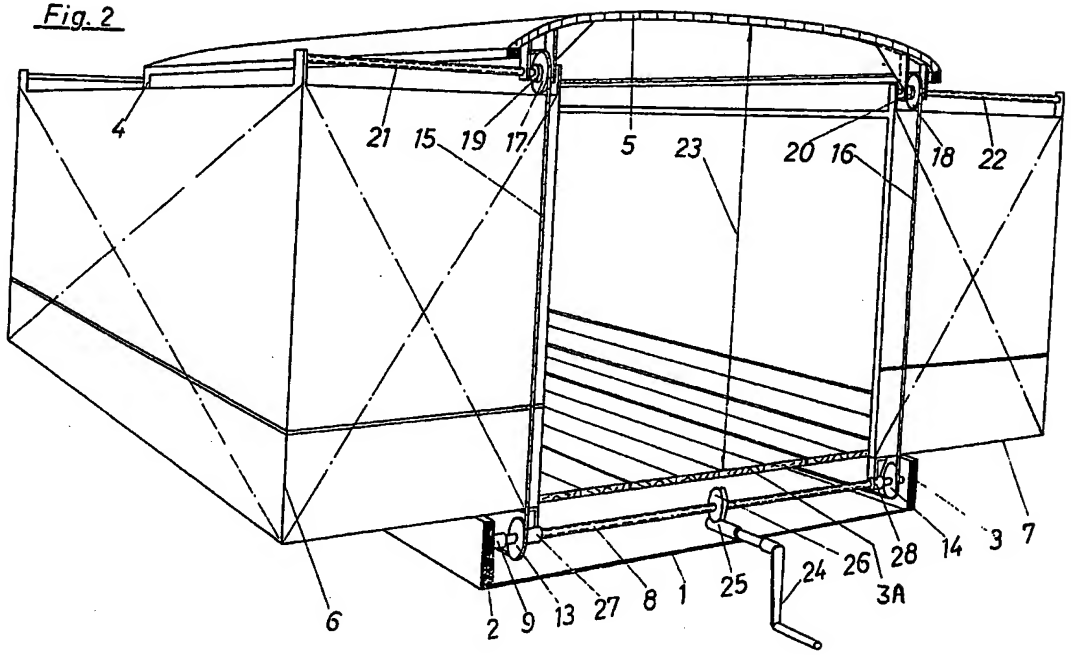
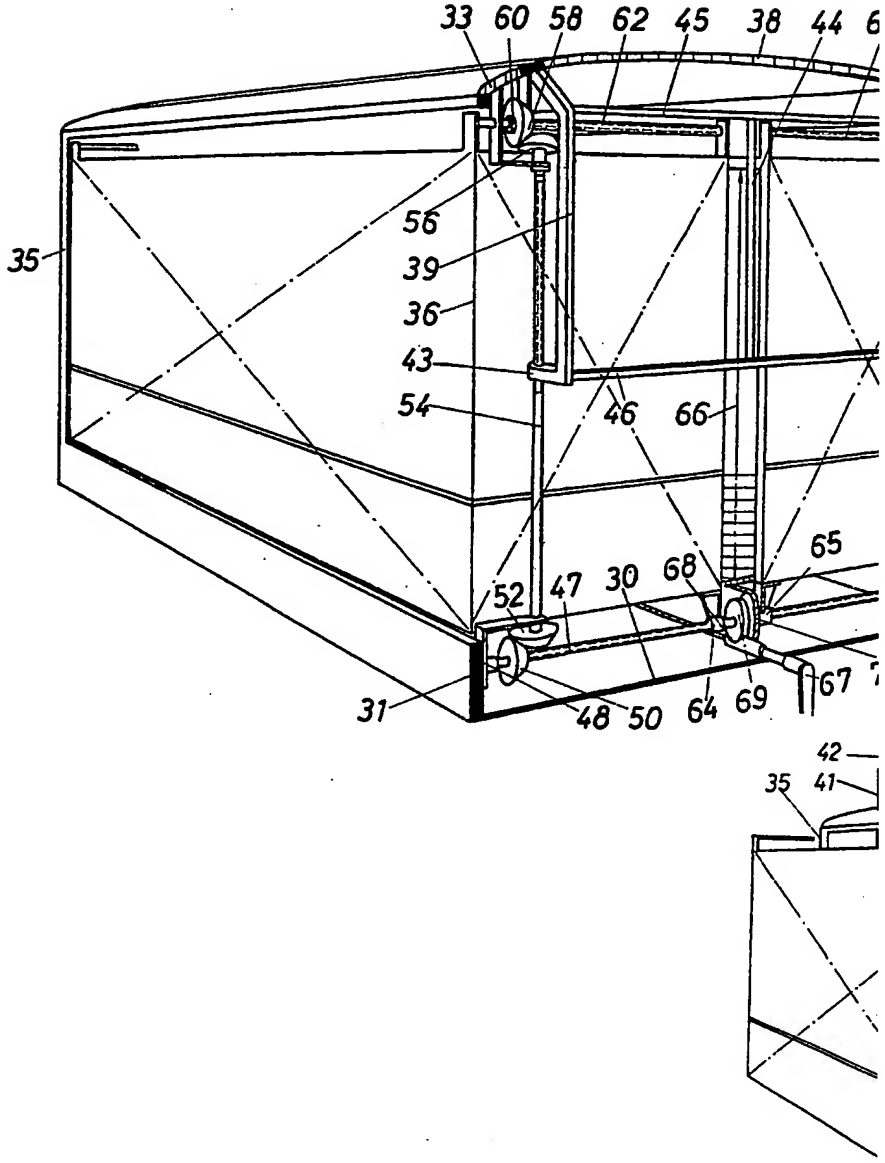
Fig. 2





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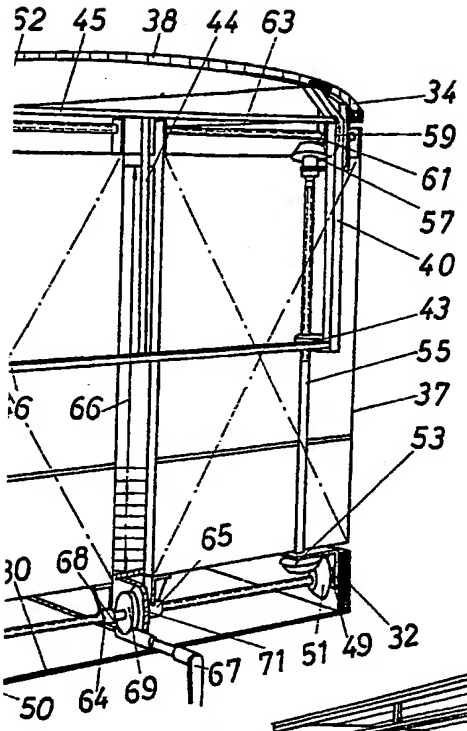
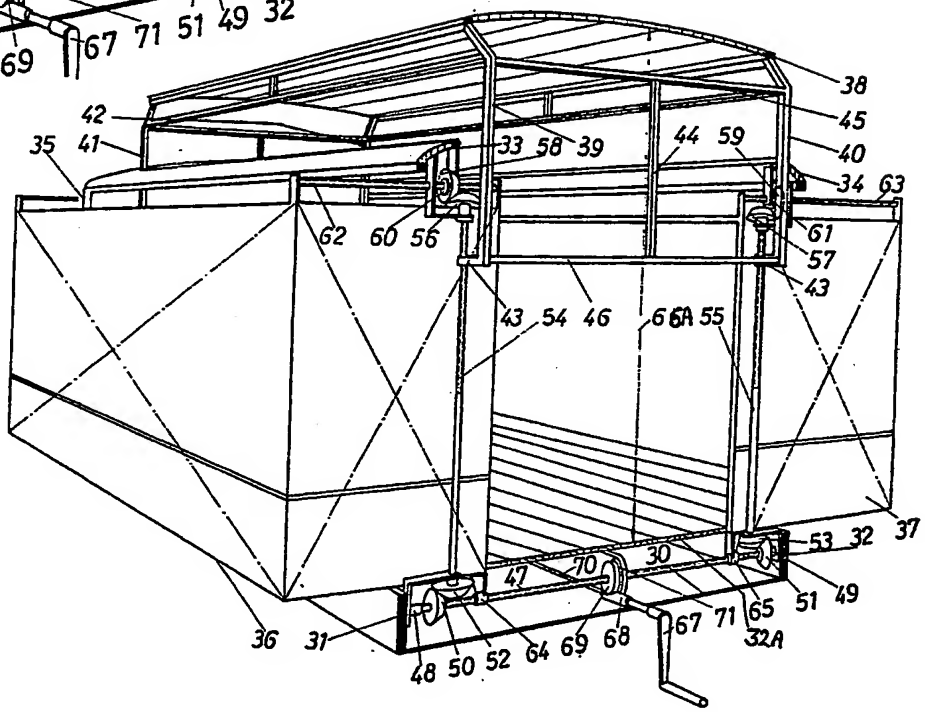


Fig. 3

Fig. 4



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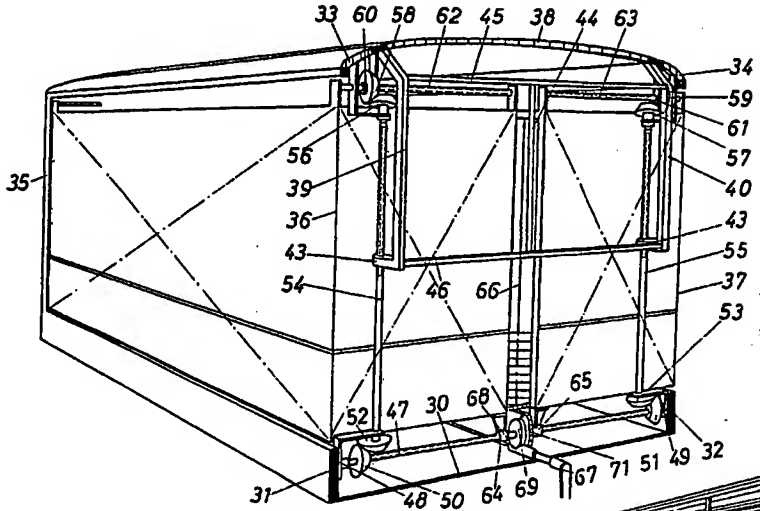

Fig.3

Fig.4